Scientific American.

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL, AND OTHER IMPROVEMENTS.

VOLUME XI.] NEW-YORK, OCTOBER 13, 1855. [NUMBER 5.

THE
Scientific American,
PUBLISHED WEEKLY
At 128 Fulton Street, N. Y. (Sun Buildings.)
BY MUNN & COMPANY.

O. D. MUNN, S. H. WALES, A. E. BEACH.

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Great Western Railway of Canada.

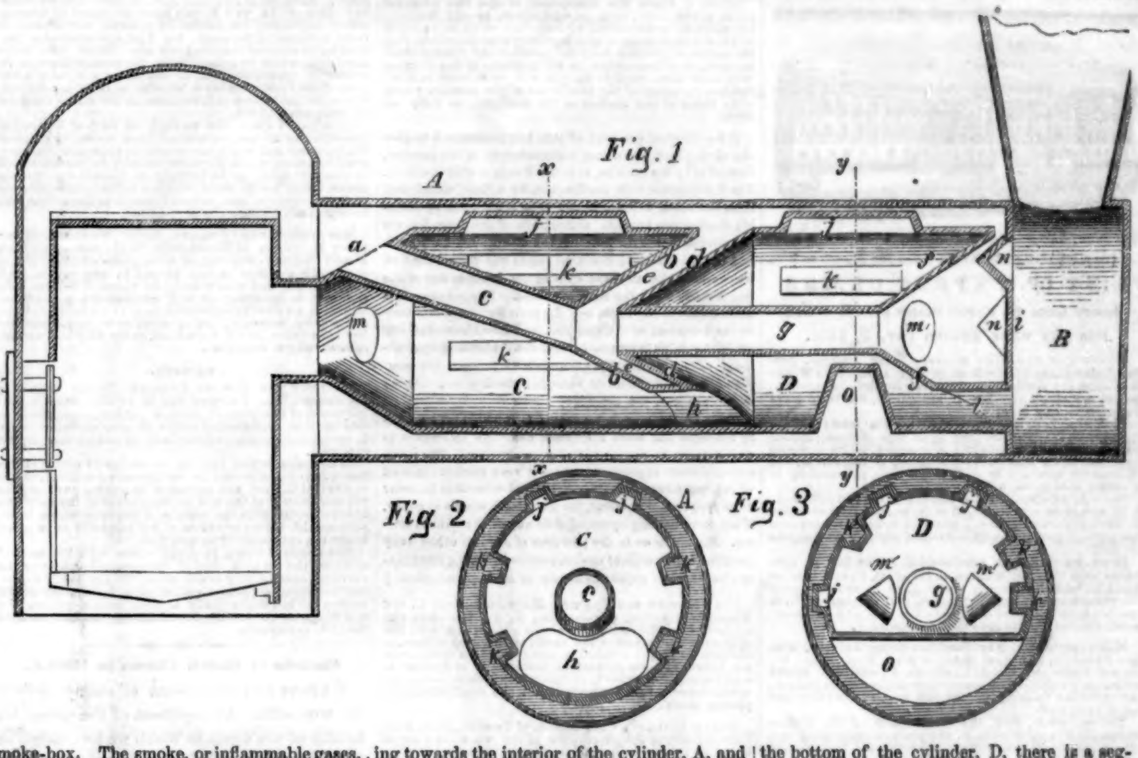
The following is a brief report of the workings of the above-named railroad for the six months ending 31st of July last, furnished by the locomotive Superintendent:

Number of engines for working passenger and freight trains 40; average number of engines in working order daily 34; average number of engines under repair 5; average number of engines renewing 1; total number of miles run by passenger and freight trains 503,781; average number of miles run per day, (no train on Sunday's,) 3,250; average number of miles run by each engine 15,266; passenger trains averaged 5,500 cars; passenger trains, weight with contents, 250 tuns; quantity of wood consumed for the six months 13,373 cords; average number of miles run with one cord of wood 37 1-2; cost of fuel per mile run 85 cts.; total cost $125,230 51. $8 58 cts. per mile run.

HENRY YATES, Locomotive Sup't.
Hamilton, C. W., 1855.

Improvement in Steam Boilers.

DUTCHER'S PATENT STEAM BOILER.



The accompanying engravings represent the improvement in Steam Boilers for which a patent was granted to Josiah J. Dutcher, of New Haven, Conn., on the 14th of August last. Fig. 1 is a central longitudinal section of the body and smoke box of the new locomotive boiler. Fig. 2 is a transverse section, taken at line x x, fig. 1. Fig. 3 is a transverse section, taken at line y y. Similar letters refer to like parts in all the figures.

The nature of the invention consists in placing within the common cylindrical part of a boiler one or more cylindrical flues, terminating in frustums of cones, which have their truncated ends towards the fire box, and bases toward the smoke stack, and serve to form communication through the cylinders between the fire and chimney in such a manner as to sift more of the heat of combustion from the ascending heated currents than by common boilers.

A is a horizontal cylinder forming the exterior of the body of the boiler, extending from the fire-box to the smoke-box B, in the same manner as the external cylinder of the common locomotive boiler. C D are two horizontal cylinders of similar diameter, smaller than A, and arranged end to end within it. The cylinder C, is united with the fire-box of the boiler by the hollow frustum of a cone, a, of which the base is connected with the cylinder C, and the truncated end opens into the fire-box. At the opposite end this cylinder, D, contains the hollow frustum of a cone, b, the base of which unites with the end of the cylinder, and the truncated end with an inclined descending pipe, c, which passes through the upper side of the cone a. The end of the cylinder, D, nearest to C is connected to the base of a hollow frustum of a cone, b, in such a manner that a space, e, is left between the two cones. The other end of the cylinder D contains the hollow frustum of a cone, f, the base of said cone uniting with the cylinder, and the truncated end uniting by a pipe, g, with the truncated end of the cone d. There is a communication between the cylinders C and D, through a pipe or passage, h, which connects the lower side of the cones b d, and from the cylinder C, there is a passage, l, through the cone f, and the head, i, to the smoke-box. The smoke, or inflammable gases, and heated products of combustion pass from the fire-box through the cone, a, cylinder, C, passage, h, cone, d, cylinder, D, and passage, l, to the smoke-box. The water circulates around the cone, a, and cylinder, C, through the pipe, c, between the cones e and d, through the pipe, g, and passage, l, and around the cylinder, D, having a complete circulation both through and around the flues. In order to form cavities in which the inflammable gases may be arrested and burned, holes are cut in the sides of the cylinders, C and D, and covered with long cups, j j, the insides of the cups being towards the interior of the cylinder, A, and in order further to increase the heating surface, other openings are covered with other cups, k k, the inside or cavity of which is next the water space, and the exterior enters the interior of the cylinders. From the sides of the cone, a, small conical chambers, m', enter the water space, and similar cones, n n, enter the water-space from the head, i, of the boiler; and from the sides of the cone f, cones m' m', of an opposite character to m and n, to contain water, enter the flue. The cones, m and n, serve the same purpose as the cups, j j, and the cones, m' m', serve the same purpose as the cups, k k. At the bottom of the cylinder, D, there is a segment-shaped water chamber, o, (figs. 1 and 3,) entering the said cylinder. This serves to check the draft at the bottom, and throw it around the upper part of the cylinder, D, and cone, f, before it can escape at the passage, l, to the chimney. "By experiments" says the patentee, "with a boiler of this kind, and a tubular boiler of the kind ordinarily used for locomotives, I find that steam is raised in this boiler in a much shorter time, and with a much less quantity of fuel."

More information may be obtained by addressing the patentee, 89 Chappel st., New Haven.

CLINTON'S CORN STALK AND STRAW CUTTER.

The accompanying figures represent the improved straw and corn stalk cutter for which a patent was granted to Lyman Clinton, of North Haven, Conn., on the 10th of July last. Figure 1 is a perspective view of the whole machine, and fig. 2 that of the cutters.

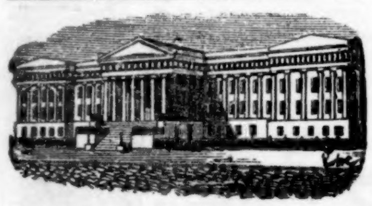
The nature of the invention consists in placing knives or cutters on two revolving winged shafts, in such a manner that their cutting edges pass closely to one another while revolving, and cut like shears. The edges of the wings placed on the shafts of the machine, have rebates formed in them, into which the edges of the cutters pass, and thereby insure the perfect cutting of the straw, which rests upon the lip of a wing while the cutter is acting.

A is the feed box, and B the standards of the frame. C C are two shafts set in bearings on standards, B, in front of the feed box, A. D D are gear wheels on the shafts, C, gearing into one another. E is a fly wheel on one end of the driving cutter shaft, and there is a crank handle on the other end of it. Each shaft has two wings, b, attached to opposite parts of their peripheries, and in line with one another, as shown in fig. 2. The wings extend on the shafts the width of the box. The edge of each wing has a rebate, c, cut in it, and a lip, d, at one side. F is a knife or cutter attached to each wing by screws. The knives or cutters are of the same length as the wings, and their cutting edges project a little beyond the edges of the lips, d; they are secured to the sides of the wings opposite to the lips of the opposing wings, and a recess is thereby formed between the cutting edge of one cutter and the lip on the opposite wing. As the shafts rotate, the cutting edges of knives, F, pass one another without interfering, similar to the action of shears, and cut the straw and stalks in the rebates, c, the lips supporting the straw to the action of the cutters without yielding, thus securing the certainty of its being cut. The straw is placed in the feed box, A, and the

knives serve the double purpose of cutters and feeders, for in the act of cutting they pull the straw forward for a succeeding cut, and so on continually.

This is a very simple straw cutter. Mr. Clinton has devoted much time to experimenting with such cutters, and has succeeded in making the improvement here represented.—The knives can be easily taken out for sharpening, and as easily replaced.

More information may be had respecting it by letter addressed to the patentee, or to E. S. Munson, No. 49 State street, New Haven, Conn.



[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING OCT. 2, 1855.

MATERIALS FOR HAT BODIES—Peter Arneson, Jorgen Pederson, and Hans Rees, of New York City: We do not claim the shell, F, and conical head, G, separately; nor do we claim the box, H, separately, for they have been previously used.

We claim, first, the combination with a feed box, having adjustable partitions therein, so that the material to be used may be proportioned in quantity, in its different apartments, the machinery for taking it therefrom, and thoroughly mixing it in said proportions, preparatory to its being used in hat bodies, as described.

Second, we claim the combination of the two cylinders, C D, and plate e, constructed as shown, viz.: the cylinder C having serrated plates, l, attached to its periphery, and the plate, e, provided with a serrated edge, for the purpose set forth.

Third, we claim the combination of the box, H, provided with the endless apron, J, the shell, F, and conical head, G, with the wings or blades, g, at its end, whereby the materials are throughly mixed, and discharged from the machine in a loose and light state, and may be delivered, without handling, to the next machine.

MANUFACTURING HAT BODIES—Peter Arneson, Jorgen Pederson, and Hans Rees, of New York City: We do not claim the boxes, I, screws, I', cylinder, h, and rollers, g, for they have been previously used; neither do we claim the formers, R, nor the fans, P, for they also have been used.

But we claim, first, the combination of the endless aprons, E F, cylinders, C D, and plate, b, and brush cylder, G, arranged substantially as shown, for the purpose of feeding the material, in a proper state, to the series of cylinders, h, and the formers, K.

Second, we claim the weighing apparatus formed of the levers, t t, ring, v, and weight, z, or constructed in any other way, when the weighing apparatus is so arranged that the former, while in motion, and the fur is being thrown upon it, may rest upon the weighing apparatus and the former, exhaust, and fur, by their weight, counterbalance or raise the weight, z, when the proper quantity of fur has been thrown upon the former to form a hat body.

Third, we claim the guides or conductors, X X, constructed of india rubber, and provided with the adjustable frames, Y Y, at their outer ends, said frames being provided with set screws, g, and arranged substantially as described, for the purposes set forth.

Fourth, we claim the employment or use of the slide or cut-off, W, and the movable bed piece or platform, T, operated automatically, as shown, or in any equivalent way, for the purpose of regulating the blast, and stopping the supply of fur to the formers, as described.

[Both the foregoing patents relate to one invention, although for the purposes of the Patent Office two distinct grants were required.

In the ordinary manufacture of hat bodies, several different kinds and qualities of fur stuff are used, the desired proportions of each being weighed out by hand, and then carried to a machine, where the fibers are loosened, cleaned, and thoroughly mixed together. At this stage of the process the material is removed and dealt out, by hand weight, into small quantities, just sufficient for single hat bodies. Each quantity is now separately passed through another machine, where the mixing and cleaning operation is completed, and the stuff thrown, by blast, upon the hat former.

The machine of Messrs. Arnesen, Pedersen and Rees is so constructed as to receive the raw material at one end, and deliver it at the other, ready made up into perfect unfelted hat bodies; all the various operations of selecting the desired quantities of each kind of stuff, mixing, cleaning, and weighing off the proper amount for each body, being done in the machine, without being touched by hand from first to last. It would require drawings in order to convey a clear idea of the various parts. The invention is one of ingenuity and importance. The quality of work it turns out is said to be better than that done by the ordinary process. We recommend these improvements to the attention of hat body makers generally.]

OPENING AND CLOSING HATCHWAYS—Henry Sizer, of New York City, and Elisha Stone, of Lowell, Mass.: We claim, first, the chain wheel, H, the chain, I, the rack, K, the doors, L, with segments of gears, M, or whole gears attached to them, and the gears, N, or the equivalent of any of these, for the purpose of opening and closing hatchway or scuttle doors, essentially as set forth.

Second, we claim the parts mentioned, either or all of them, in combination with the cylinder, B, the rope wheel, E, and the gears, C and D, for the purpose of opening and closing the doors of scuttles and hatchways, essentially as set forth

MOLDING CIRCULAR AND UNDERCUT WORK—Wm. Sellers and James Walker, of Cincinnati, O.: We claim, as the method of molding circular undercut work, as described.

COOPER'S CROZING PLANE—Hiram and J. C. Taylor, of Cincinnati, O.: We do not claim adjusting a bit, by a wedge; but we claim casting the stock in one piece, as described, and combining therewith a wedge, for the purposes set forth.

CORRUGATED REFLECTORS—Bernard Goetz, of Philadelphia, Pa.: I do not desire to claim reflectors generally, to throw light into darkened rooms, or such as have been used for lamps.

But I claim a reflector, A B, having the peculiar form of grooved or fluted undulating surface above described, and the converging grooves, a b c d, etc., a' b' c' d', etc., and crossed transversely by the other series of parallel grooves, t u v w, etc., t' u' v' w', etc., on plate, I I, in the manner and for the purposes substantially as described.

SCREW WRENCHES—Jos. Hyde, of New York City: I claim the eccentric shaft, e, and thumb piece, e, as they are arranged in relation to the screw, b, of the movable jaw, so that the screw may be thrown in and out of gear with the bar, and the jaw be moved by sliding it on the bar or through the turning of the screw, as set forth.

SEWING MACHINES—James Harrison, Jr., of Milwaukie, Wis.: I claim, first, in connection with the giving of the two needles, a a', such a movement as will cause both at once, during every revolution or stroke of the machine, to be withdrawn from the cloth for a sufficient time to effect the feed movement, the employment of a supplementary needle, b, arranged and operating substantially as described, to supply the place of the needle, a, which operates first after the feed movement, and to retain the loop in the thread which has been put through the cloth by the needle which last leaves the cloth before the feed movement, until the first named needle operates to pass through the said loop substantially as described.

Second, I claim the attachment of the clamps, I I', which hold the material to be sewed to two swinging guide plates, G G', or their equivalents, which serve also as guide plates for the needle bars, and thereby cause the needles and the clamps to swing together, substantially as described, whereby the clamps are enabled to accommodate themselves to different or varying thicknesses of material, and to be opened to slacken their hold upon the material during the feed movement, and the needles are enabled to be kept in a proper or desirable relation to the clamp.

Third, I claim the connection of the two swinging guide plates, G G', or their equivalents, in any manner, substantially as described, whereby one of them is caused to have a movement so much greater than the other, that the relative movements of the needles and clamps shall be such, that the needles in all positions of the clamps, will cross each other in the plane of, or as near as is desired to the plane of the face of one of the clamps, which is the plane of one surface of the material, as fully set forth.

[The object of one part of this improvement is to give the cloth a feed movement independently of the needles, instead of by the needles, as in the Avery sewing machine. For this purpose both needles are, for a time, withdrawn from the cloth, to leave it free to be acted upon by suitable feeding mechanism. Other parts of the invention are to provide means for holding the material to be sewed, and admit of its being liberated before and during the feed movement; also means of causing the interlacings of the two threads when the seam is formed, to be always as close as desirable to one surface of the material, whatever may be the thickness of the material, and notwithstanding any variations in its thickness: also in a self-adjusting arrangement of the feeding apparatus, which permits the sewing of stuff of different or changing thicknesses, without any stoppage of the machine.

These improvements we regard as valuable. The Avery machine has been somewhat defective in respect to convenience in sewing variable thicknesses. The present invention appears to render it very perfect; instead of requiring considerable mechanical education in order to its proper management, the machines become as easily, if not more handily operated than any of the shuttle sewers. Mr. Harrison is the patentee of several other very peculiar and excellent improvements in sewing machinery; but this last strikes us as one of his happiest efforts.]

FEED MOTION FOR PLANING MACHINES—Seth C. and Westel W. Hurlbut, of Boonville, N. Y.: We claim the application of the worm wheels, in connection with the spur wheels attached to the shafts of the feed rollers, to effect their proper revolution, and to admit of their opening apart, to receive various thicknesses of lumber, as above described. This application we claim as novel, and as our invention, in connection with the feed rollers of a planing machine.

STEAM BOILERS—Chas. Moore, of Trenton, N. J.: First I claim limiting the circulation of the water in a steam boiler by means of a partition, so constructed as to separate the water over the fire, or some portion of it, or the water which is highly heated, or that which ascends through the tubes, from mixing with the water around the sides of the boiler, which is at a lower temperature, substantially as described, for the purposes set forth, and thereby prevent it from descending, so as to enter the tubes again at their lower ends.

Second, I claim so constructing and arranging the tubes in the fire space, that the burning fuel will surround the horizontal parts of the tubes, and a portion of the perpendicular parts, substantially as described, for the purposes set forth.

Third, I claim extending the tubes downwards which pass through the fire space, after they leave said space, and terminating them perpendicularly in the water space, so as to prevent or retard the water, which is highly heated, or the steam generated in the tubes, from escaping at the lower end, substantially as described.

CHIMNEY STACK—Benj. F. Miller, of New York City: I claim constructing and placing a solid or hollow cone, or a pyramid, in the mouth of a funnel or smoke stack, with its apex upwards, or pointing outwards from the mouth of said chimney or pipe, in combination with the surrounding shield furnished with flanches as described; constructed and located substantially as set forth.

I do not claim as new, or as my invention, the conical shield or the conical band and circular flanch described, they having been already applied or placed at the top of smoke pipes, for the purpose of ventilation. I do not claim placing a single cone with its apex pointing inwards in the smoke pipe or chimney, as new, and first invented by me.

KNITTING MACHINES—Jos. Powell, of Waterbury, Ct.: I claim, first, so combining two sets of needles, such as are commonly employed on knitting frames, that they may be brought into joint action, and have loops formed on both of said sets, at one and the same time, and thus form a ribbed fabric, as described.

Second, I claim the arrangement of the needle bars and the two pressure bars, so combined that when both sets of needles are in action, both pressure bars will also act upon the barbs of the needles, as described.

Third, I claim the self-setting latches, in combination with the needle and pressure bars, as described.

Fourth, I claim the combination of the regulating bar, u, with the shifting bar and the set screws, for regulating the throw of the sinkers, and depth of the loops, as described.

Fifth, I claim the manner of discharging the loops, that is to say, casting off those of one set of needles a little in advance of those of the other set, and giving to the first set of needles an upward motion, as soon as the cast-off has been effected from them, for the purpose of relieving the strain, as set forth.

SHIPS PUMPS—Samuel Pearn, of New York City: I wish it to be distinctly understood, that I do not limit myself to the mode of mounting the said pump, and of imparting motion thereto, which may be varied at pleasure.

I claim the combination of the two series of oppositely inclined conical pipes, when the small ends of the pipes of one series are inserted, and project within the body of the pipes of the other series, and vice versa, with sufficient space around the inserted ends for the return of the water, as the apparatus is vibrated, alternately, in opposite directions, substantially as and for the purpose specified.

CLOCK ESCAPEMENT—E. K. Reynolds, of New York City: I claim constructing the staff, d, of the balance, with a spiral groove, e, and so arranging the balance that the point of the lever, C, will work in the said groove, and give the requisite motion to the balance, substantially as described.

[This escapement is more particularly designed for clocks, and other time-keepers, which are intended to run a long time without winding; on account of its very slow movement it is particularly suited to year clocks. It consists in an escapement lever, whose point works in a spiral groove or screw thread, in or upon the staff of the balance; the latter is arranged perpendicularly to the arbors of the lever and escapement wheel. It is a very ingenious but simple improvement, adding but very little to the expense of a time-piece, although greatly increasing its convenience. Applied to a common one-day clock, the latter will run a week without winding, while an eight-day piece will only require to be wound once a month. Year clocks, we are told, can be produced with equal facility. Mr. Reynolds appears to have displayed much ingenuity in the production of this improvement.]

MACHINE FOR PREPARING RATTANS, &c.—Chas. C. Reed, of Philadelphia, Pa., assignor to himself and Wm. S. Reinert, of same place: I claim, first, the combination of the adjustable table or plate, G, with the upright feeding and guide rollers, H, for enabling the upper surface of said table or plate to be graduated to the grooves in the rollers, substantially in the manner and for the purpose set forth.

Second, I claim arranging the adjustable side bars, L, in such relation to the upper and lower parts of the flexible portions of the springs, K, as to enable them to be graduated so as to arrest the outward movement of the lower flexible portions of said springs, at such points as to allow the rollers to yield sufficiently to receive and embrace the rattan between them, and yet prevent one of them from moving further from the center than the other, so as to keep the rattan, at all times, in the center groove, and at the same time allow a slight and stiff elastic movement to the upper portions of the springs above the bars, to allow either of the rollers to yield to the inequalities on either side of the rattan, as fully set forth.

THERMO-UDORIC FILTER—Gustavus Weissenborn, of New York City, assignor to Epes W. Sargent, of same place. Patented in England, Nov. 17, 1854: I do not make any claim to the well-known result produced by heating water containing impurities or mineral substances, to cause a deposit of the same; but I am not aware that impurities or mineral matters have ever before been separated from water by commingling the same with steam in a suitable apparatus, to heat the water and cause a deposit of the foreign matter it contains on twigs, brushwood, stones, or other suitable substances, in the manner and for the purposes set forth.

Therefore, I claim the method set forth of separating impurities or mineral substances from water, by so introducing steam and water into a suitable apparatus that they shall commingle, and the water thereby be heated, to fall in a shower upon, or be brought in contact with pebble stones, twigs, brush wood, or other suitable substances or surfaces, whereon said mineral matter or impurities will be deposited, substantially as specified.

MACHINERY FOR FILLING SEINE NEEDLES—Humphrey M. Glines, of Manchester, N. H., assignor to John M. and Simon F. Stanton, of same place: I claim giving the needle a rotary motion around its own center, both longitudinally and transversely, by means of devices, substantially as described, or their equivalents, in combination with a vibrating delivering arm or its equivalent, so constructed, arranged, and operated as to supply and deliver the twine, or other material, to the aforesaid needle, substantially as described.

RE-ISSUE.

MACHINE FOR SAWING LUMBER—Pinney Youngs, of Milwaukie, Wis. Patented Jan. 30, 1855: I claim the employment of two pairs of shifting guides, substantially as described, in combination with a circular saw, alternately in opposite directions, substantially as and for the purpose specified.

I also claim setting the log or timber by means of the two screw-shafts, geared in the manner described, or the equivalent thereof, and operated by griping pawls which act against stops at the end of the motion of the carriage, in combination with the arms and adjusting slides, to determine the degree or extent of set intended to be given to the log, substantially as specified.

And finally, I claim, in combination with the method of setting the log at the end of the several motions of the carriage, substantially as described, the method of throwing the setting apparatus out of gear by the bar which carries the log, substantially as described, to prevent the said bar, with the holding dogs, from approaching too near the saw, as set forth.

Statistics of English Patents in 1854-5.

We have now the means of seeing plainly the wonderful developement of the inventive faculty of the times in which we live, aided, as it has been, by the legal changes of 1852.—This insight arises from the new provision as to statistical tables, from which we find that the number of applications for provisional protection recorded within the year 1854 was 2,764; the number of patents passed thereon was 1,876; the number of specifications filed in pursuance thereof was 1,828; and the number of applications lapsed or forfeited, the applicants having neglected to proceed for their patents within the six months of provisional protection, was 888. The number of applications recorded within the first six months of the current year (1855) was 1,493, showing a probable increase as compared to the number of the year 1854.—[Practical Mechanic's Journal.

New Building Material.

The Cleveland *Herald* speaks of a new kind of bricks which have been introduced there for building purposes. They have the appearance of granite, and are made of sand and lime, the blocks subjected to a great pressure while nearly in a dry state. In size they are ten by four and five inches, and hollowed, the indented part being seven by one and a half inches. After the bricks are formed into shape and pressed, they are subjected to the action of the atmosplere, and soon become as hard as rocks, and insensible to the frost or rain. These bricks are said to be cheaper than clay bricks, because they furnish so smooth an interior surface that no plastering is necessary, and being hollowed, the walls do not require to be firred.

[This material was patented Jan. 16, 1855, as a new article of manufacture by the heirs of John A. Messinger, deceased, of Milwaukie, Wis. Bricks thus made are composed of one part of lime and twelve of sand, mixed with water and compressed in molds.

Chief Justice of the District of Columbia.

The Hon. George H. Hopkins, of Virginia, has been appointed Chief Justice of the District of Columbia, to fill the vacancy caused by the death of Judge Cranch. This is the Judge before whom appeals from the Commissioner of Patents will be tried. Mr. Hopkins is now a Judge in Virginia, and has been a Member of Congress. He is known to be an able lawyer, and one well qualified to fill the important office to which he has been appointed.

Restoring Fibrous Iron.

It has already been noticed in our columns that the huge wrought-iron gun of Nasmyth in England, from which so much was expected, had proved an entire failure, owing to the wrought iron returning to a crystalline condition. Prof. Noad—the distinguished English chemist—states, that its fibrous character can perhaps be restored by the common process of reheating and slow cooling. The tendency of fibrous or wrought iron to pass to the brittle or crystalline state is promoted by various causes, but more especially by vibrations. To the latter cause, no doubt, is to be attributed the fall of many iron bridges, and structures dependent on chains, which from frequent concussions, assume a crystalline form, and become very brittle. While on a visit, a short time since, to an iron work in Wales, Prof. Noad noticed a large quantity of iron chain lying about, which could easily be broken by a smart blow from a hammer. Some of these links he took, and had heated strongly in a furnace and then cooled slowly under a bed of fine and. After the lapse of twenty-four hours, they were examined, when the metal was found to have recovered its tenacity, and could no longer be broken to pieces by the blow of a hammer as before. After repeated blows, however, one was broken, and it was found to have returned to the fibrous state—every trace of crystalline character had disappeared. He therefore concludes that the iron of Nasmyth's huge gun had returned to a crystalline state, not from having been kept long in an incandescent state (as has been asserted,) but because of long-continued and violent hammering. He therefore recommends the gun to be submitted to a very high heat, and then allowed to cool very slowly, anticipating thereby that the fibrous texture and tenacious character of its metal will be restored. These hints will be useful for others beside Mr. Nasmyth, in pointing out what may be effected in restoring brittle wrought iron to tenacity by annealing it.

Those Prizes Once More.

We would state for the benefit of those who are engaged in procuring Clubs of subscribers to the SCIENTIFIC AMERICAN, and to any who yet propose to compete for our Prizes, that, as yet, there is ample chance for an ordinarily energetic person to step in and take the highest palm. We have received several lists of names, but they are so short, comparatively that they may be easily excelled. A list of the Prizes we publish in another column. There are fourteen in all, and the highest is for the sum of $100. All of them are payable in hard cash on the 1st of January next. Wake up, young men, and see what you can do.

Flying Ants.

Foreign papers state that a singular phenomenon was lately remarked at Brenets, on the frontier of Switzerland. About half an hour before sunset myriads of insects, supposed to be winged ants, were seen to rise from the banks of the Doubs, in dark triangular swarms, and to fly southward, occupying a space of nearly a league in extent. They were sufficiently compact to intercept the view of the country at intervals. A similar phenomena has been witnessed this season in many parts of our country. The ant tribes require further investigation by entomologists.

Since the application of steam on our Western waters, there have been 39,672 lives lost by steamboat disasters, 381 boats and cargoes lost, and 70 boats seriously injured, amounting in the aggregate to the enormous sum of $67,000,000.—Ex.

Professor Emmons, the State geologist, of New York, has traced in the valley of the Adirondac, for a distance of two and a half miles, a bed of rich iron ore. He says there might be procured within two feet of the surface, seven million tuns of ore, which would make three million tuns of superior iron.

It is officially announced in the *Moniteur* that the French Exhibition is to remain open until the 20th of November.

The venerable Alexander Humboldt celebrated his eighty-sixth birthday on the 14th ult., and this in the full enjoyment of all his intellectual powers.

[For the Scientific American.]

Photographs and Stereoscopic Angles.—The True Theory.

The scientific world have justly awarded to Prof. Wheatstone the honor of discovering that two distinct pictures of nature, taken from different points of view, may be made to coincide as one, and appear like a model, or solid in perfect relief. For this purpose Wheatstone arranged an instrument using reflectors, and named it the "Stereoscope," from two Greek words, which mean "seeing solids." Another instrument was constructed with an arrangement of lenses by Brewster. The perfect human vision of the two eyes is stereoscopic, and with a little careful practice two pictures, 6 by 8 inches in size, may be seen stereoscopically without either reflectors or lenses. The fact of the apparently solid combination having been established, it was not difficult to comprehend that daguerreotypes and other photographs might be readily made to answer the purpose admirably. Thus we see how the question must arise at once as to the points of sight from which to make the two pictures, or, in other words, an inquiry for the correct stereoscopic angles. An article of eighteen pages in the *North British Review* for May, 1852, gave very elaborate algebraic calculations for varying the angles according to the distance of the points of sight from the objects to be pictured. The space between the eyes, or two and a half inches, was to be the distance of eighteen inches from the object; and twelve feet from the object, the space between the points was to be eighteen inches. Sir David Brewster read a paper before the British Association for the Advancement of Science, and illustrated his theory by experiments, attempting to prove that the distortion universally noticed in the stereoscopic picture was caused by using lenses larger than the lens of the eye, and this theory was very generally embraced. In March, 1852, Messrs. Southworth and Hawes, of Boston, Mass., simultaneously discovered in their course of experimenting that the directions of Wheatstone were not correct as to the points of sight, that instead of these being on a horizontal line, the two points should be at an angle of 45 deg. with the horizon; that is, as far as one point is carried from the other to the right or left horizontally, so much must it be raised or lowered perpendicularly, and that the average space between the eyes is as near the proper distance for each movement as under the various circumstances can be attained. The pictures thus taken combine perfectly, without distortion, and appear to an artist's eye correct in drawing, and in perfect proportion. As there have been so many theories advanced, it is not to be presumed that a new one will be embraced without a clear philosophical demonstration of its principles.

1. Binocular Vision.—There is delineated upon the retina of each eye different images of the same objects, because the eyes occupy different points of sight. The slightest change in position varies the images upon the retina, and the universal joint of the neck; and our means of locomotion permit us, in judging of sizes, distances, and proportions, to realize very many different views of objects much quicker than we can express our judgment by language. In a fixed position, with the eyes on a horizontal line, we do not see objects in nature as they are, or in other words, the assumption that "the human eyes are only placed two and one half inches apart, and see solid objects in their proper solidity and relief" is incorrect and untrue, either in fact or in theory. With the two eyes on a horizontal line, all horizontal lines of objects towards which we direct our vision, whether near or distant, appear on the same plane. We see nothing over or under one line with one eye that is not seen with the other. We could, therefore, draw on one canvas all the horizontal lines seen with both eyes. Not so the perpendicular lines. With the right eye we should see lines beyond and around the nearer ones not seen with the left; and so with the left eye we should see lines around and behind not seen with the right. We could not draw the perpendicular lines, seen with both eyes, on one canvas, or in one picture. The perpendicular lines would have their own planes, and each would be different and in perspective. For example, suppose a cylinder supported horizontally by two columns; take a stand directly opposite, at equal distances from each column; the cylinder will appear, on its upper and under outline, to touch what lies in the background, whilst the columns will come forward to their proper places. Nothing will appear to one eye behind the cylinder that does not appear to the other, but each eye will see behind the columns in the background something not seen by the other eye. It is not a fact, then, that the human eyes see objects in nature as they are from two points on a horizontal line. Let us suppose, instead of the left human eye occupying the present horizontal relation which it does to the right eye, that it had been placed first as far over its present position as it is removed from the right horizontally, we should then, in one fixed position, have seen around on right and under objects with the right eye, and as far around on the left, and over objects with the left eye. We should see over horizontal lines or under as much as we see to the right or left of perpendicular ones. Each horizontal line would be in the same picture plane with its own perpendicular. Each eye would require its own canvas to picture what it sees, both horizontally and perpendicularly. As, however, our eyes are placed in the best position, considering their various relations and uses, we are given the universal joint of the neck, and powers of locomotion, so as to change them into the particular positions which our various duties may dictate. We feel, on reflection, that the common phrase "unless my eyes deceive me," is neither inappropriate nor improper.

2. Stereoscopic Pictures.—A picture may represent nature as seen with one eye in a fixed position; but until Wheatstone arranged the stereoscope it required a model of nature—the actual sculptured forms of things—to represent what we see with two eyes, or to represent solidity. Wheatstone taught us that two pictures might be so arranged as to appear solid and statue-like, showing relief, not by lights and shadows, but by difference of outline, by combining them into one apparent image, the same as the images on each retina combine to show us nature itself. But it was seen at once that the pictures made and arranged according to Wheatstones' theory were out of proportion and out of drawing; that whilst they were wonderful as curiosities they were also wonderful monstrosities. In *this fact*, Brewster and others were not mistaken; and had they not erred in assuming that "objects seen correctly with the eyes when pictured, and the images again reproduced upon the retina from the pictures, instead of showing nature, were distorted and disproportioned," they would doubtless have finished the solution of the problem of the stereoscope so well commenced.

Having shown that the human eyes in one fixed position do not see solid objects correctly, it follows, of course, that an exact reproduction of the same images upon the retina will produce again the same imperfections. As it is not known how to combine more than two images in the stereoscope, and whilst viewing them we cannot change the outlines by inclining the head to the right or left, or changing place, we ask, "From what two points of sight, in any case, shall pictures be made and arranged to represent nature without any distortion or disproportion?" The true stereoscopic angles are always upon a line at an angle of 45° with the horizon, and about three inches and six-tenths apart. This is for the average space between the eyes, allowed to be two and one-half inches. It makes no difference which way the angle is drawn, as it regards the relative proportions of the picture or its correctness. Having selected one point of view, there are four other points from which a correct stereoscopic combination may be made. These four points are the four angles of a square, whose sides are five inches, two sides horizontal and two perpendicular; the first position being the interesting point of two lines drawn diagonally from opposite angles. This is correct for any distance beyond the focus of the ordinary vision. For objects very far off, or for microscopic objects, an allowance must be made, so as not to exceed that distance which will permit the two pictures to combine easily without troubling the vision or appearing double.

We come now to the only difficult question in connection with this subject. Do the lines of objects in nature in the same plane as the two points of sight taken at an angle of 45° with the horizon, and arranged in the stereoscope, show proper relief and assume their places, or do they appear to touch the background? The answer is, they appear in precisely the same relief as their own horizontals and perpendiculars, and appear true to nature.

Explanation.—Nature is solidity, and the stereoscope represents it as solid. Nature has her horizon or water level; the horizontal supports or balances, the perpendicular. In whatever position we place our eyes, or however we may view nature, we are conscious of the horizontal and the perpendicular; we measure every other line or angle from the horizontal to the perpendicular. Every intermediate line must have its own horizontal and perpendicular, and these are its support. The horizontal and perpendicular lines supporting one another being each to its own position in nature and in the stereoscope. Thus a brace at an angle of 45° must have its support from its perpendicular post, and though viewed in a stereoscopic representation, will assume its proper place, whether the post or beam to which it attaches is in the view or not. It bears the same relation to its supports as though they were pictured in the view. These are principles upon which the value and perfection of stereoscopic pictures depend, and they are as unchangeable as any problem in geometry. This theory, and the peculiar manner of taking the pictures is our own by discovery, and covered by letters patent in the United States and England.

Albert S. Southworth.

Boston, 1855.

The Blow Fly.

Messrs. Editors—I noticed, some time ago, in a number of the Scientific American, an article on the "blow-fly," stating that the eggs were hatched after a deposit. This is not the case with the blow-fly, or screw-fly (so called here,) so well known and dreaded by Texas stock raisers. It belongs properly to the order *diptera*, div. *muscidæ*, and the eggs are hatched the body of the female, the maggots being brought forth alive. I have frequently noticed this. Their appearance is much the same as the woods-fly (*hippobosca*,) but more distinctly marked.

B. C. C.

Texas.

Overshot and Turbine Water Wheels.

Messrs. Editors—It would be well if some of our hydraulic engineers would get up the very best turbine wheel possible; and do the same with an overshot wheel; have each favorably situated, give each the same amount of water, couple them together, and see which will run the other back. It will not do to talk about a turbine being superior to a favorably situated overshot; if they will try the experiment they will find the turbine running backwards. The argument I shall not enter upon.

J. H. J.

[This would be an expensive experiment, and it is not likely that it will be tried very soon, at least with large wheels. But surely the brake is a good test for both kinds of wheels; it is as fair for one as the other.

Ancient Indian Mortars.

The Placerville (California) *American* says, that in almost every locality in the mining districts are found, at all depths from the surface, and generally upon the bedrock, these ancient mortars, relics of an ancient race. We say this because the present race do not use them of the form we find them. The only means used by the present race for rendering their acorns and seeds to flour, is by the use of pestle-shaped stones, in their primitive unworked form, upon the surface of rocks, or in circular cavities, worn sometimes to the depth of a foot by the repeated use of the pestle or pounder; while the mortar of olden time is a boulder, nearly round, and from six to sixteen inches in diameter, a little flattened at the bottom, with a cavity from half to three-fourths its depth from the top, and of a material entirely different from all adjacent rocks. The pestles, too, almost always found with these mortars, show much work to have been bestowed upon their formation. How came these ancient relics so deep beneath the present surface of the ground, sometimes fifty feet? Seldom if ever found in the bed of rivers, but often in tunneling the hills, where strata of lava and conglomerate rocks lie many feet thick above the earth in which they are imbedded. California presents a wide and almost untrodden field, not only for the geologist, but the antiquarian, because so new, and its physical formation so peculiar.

Bronze.

The analysis of a few pieces of bronze, of undoubted antiquity—namely, a helmet with an inscription (found at Delphi, and now in the British Museum,) some nails from the treasury of Atreus, at Mycenæ, an ancient Corinthian coin, and a portion of a breast-plate or cuirass, of exquisite workmanship (also in the British Museum,) affords about 87 to 88 parts copper to about 12 to 13 tin, per cent. The experiments of Klaproth and others give nearly the same results as to ingredients; the quantities sometimes slightly differ. Lead is contained in some specimens, as has been shown. Zinc, and the nature of it, was not known to the ancients. In an antique sword, found many years ago in France, the proportions in 100 parts were 87-47 copper, 12-53 tin, with a small portion of lead, not worth noticing.

Bell metal is a compound of 80 parts copper to 20 parts of tin. The Indian gong, so much celebrated for the richness of its tones, contains copper and tin in the above proportions. The proportion of tin in bell metal varies, however, from one-third to one-fifth of the weight of copper, according to the sound required, the size of the bell, and the impulse to be given.—M. de Arcet, of France, has discovered that bell metal formed in the proportion of 78 parts copper, united with 22 of tin, is indeed nearly as brittle as glass, when cast in a thin plate or gong. Yet if it be heated to a cherry red, and plunged into cold water, being held between two plates of iron, that the plate may not bend, it becomes malleable. Thus he manufactures gongs, cymbals, and tantums out of this compound.

Coal in Turkey.

At Heraclea, a distance of twelve hours sailing from Constantinople, there is an abundance of good coal, but owing to the supineness of the Turks, it has not been made available until the past year. An English company has made a contract with the Turkish government, and has to pay about two and a half dollars as a rent upon every ton raised. It is calculated that 60,000 tons will be raised this year, a fine market for its sale being the supply of the steamships in the Black Sea.

The First Time Keeper Made Out of Clay.

M. Raby writes, from Paris, that this great industrial achievement was deposited at the Exhibition on August 22, and that it was inspected by the Queen and Prince Albert with amazement and admiration. The following is an extract from his letter:—"My famous pocket chronometer, made out of the precious aluminium, has been placed in the Panorama, alongside of the bars of the same metal; it keeps time very correctly. All the works, plates, cogs, and wheels, are made of aluminium; and I really believe it is much better for purposes of this kind than the other metals generally employed. It is much lighter, does not require so much power to conduct the wheels, and, therefore, with a heavy balance, will obtain a better result of regularity. It is very hard and smooth when hammered, and the friction will be reduced to almost nothing."—[London Mining Journal.

Varieties of Speed.

The velocity of a ship is from 8 to 18 miles an hour; of a race-horse, 29 to 33 miles; of a bird, 50 to 60 miles; of the clouds in a violent hurricane, 80 to 110 miles; of sound, 823 miles; of a cannon ball (as found by experiment,) from 600 to 1000 miles; of the earth round the sun, 68,000 miles—more than 100 times quicker than a cannon ball; of Mercury, 104,000 miles; of light, about 8,000,000 miles, passing from the sun to the earth in about 8 minutes, or about a million times swifter than a cannon ball.

The old custom of lighting up the mills of Lowell, and continuing the work until seven and a half o'clock in the evening, is discontinued for the present season. Work now ceases at half-past six o'clock, thus giving the operatives the use of long evenings.

[Good.

New Inventions.

Prevention of Dust in Railroad Cars.

Mr. Wm. H. Muntz, of Boston, Mass., has invented an improvement in railroad cars, for preventing the rise of dust. It consists in running a line of perforated pipes along the outside of each car, in such a manner as to permit the simultaneous discharge of many jets of water, in a lateral direction. These jets are intended to spurt out 10 or 15 feet from each side of the car, forming a fine rain to prevent the rise of dust. The tank for supplying the pipes will be carried on a separate truck, or, each car may be furnished with its own reservoir.

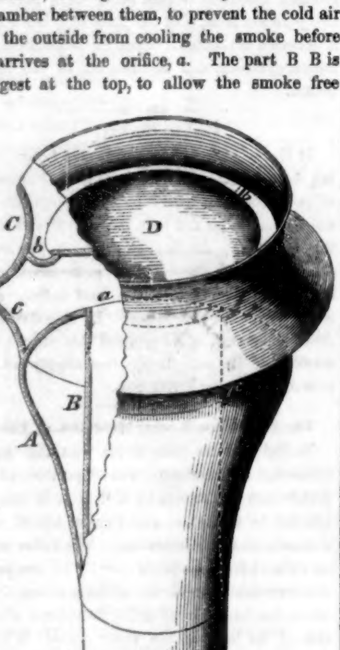
Turbine Water Wheels.

Since the appearance of our notice of Mr. Francis' work upon turbine wheels in Number 1, we have received several letters asking where it can be obtained. These inquiries should be addressed to Little, Brown & Co., Boston—the publishers.

Camp's Patent Chimney Cap.

The accompanying figure is a perspective view, partly in section, of a chimney cap, for which a patent was granted to Mortimer M. Camp, of New Haven, Conn., on the 4th of last month (September.)

The lower part of the chimney cap is made of cast iron, or other suitable material, and of the form shown. It is made of two parts, A A and B B, leaving an enclosed space or hot air chamber between them, to prevent the cold air on the outside from cooling the smoke before it arrives at the orifice, *a*. The part B B is largest at the top, to allow the smoke free



egress. Thr upper part, C, of the cap is made of sheet iron, and is somewhat larger in diameter than the largest part of A. This part, C, is made flaring both ways, as shown, and to its inside is attached a disk, D, which is larger than the orifice, *a*. This disk is sustained by braces, *b b*. The flaring cap, C, is sustained by braces, *c c*, as shown. It is now ready for being attached to a chimney by its lower end, E, which is substantially secured in position by any known way.

The patentee states that he has found "by extensive experiments and practice, that this cap increases the draft of a chimney when the wind is blowing without reference to its direction. By the interposition of disk D, and the curved flaring surfaces, a partial vacuum is formed at the orifice, *a*, on the opposite side of the cap to the direction of the wind, and the smoke flows upward towards it, and is carried away by the current of air." This, he states, has been found to be the way this cap operates, even when the chimney top is shaded by surrounding buildings. The non-conducting chamber between A and B serves to prevent the condensing of the smoke, and thus also tends to promote good draft in the chimney.

More information may be obtained by letter addressed to Mr. Camp, No 134 Chappel street, New Haven, Conn.

There are now in Georgia between fifty and sixty cotton factories, conducted in the most skillful and successful manner, with all the appliances in the way of machinery that are found in the same kind of establishments in New England.

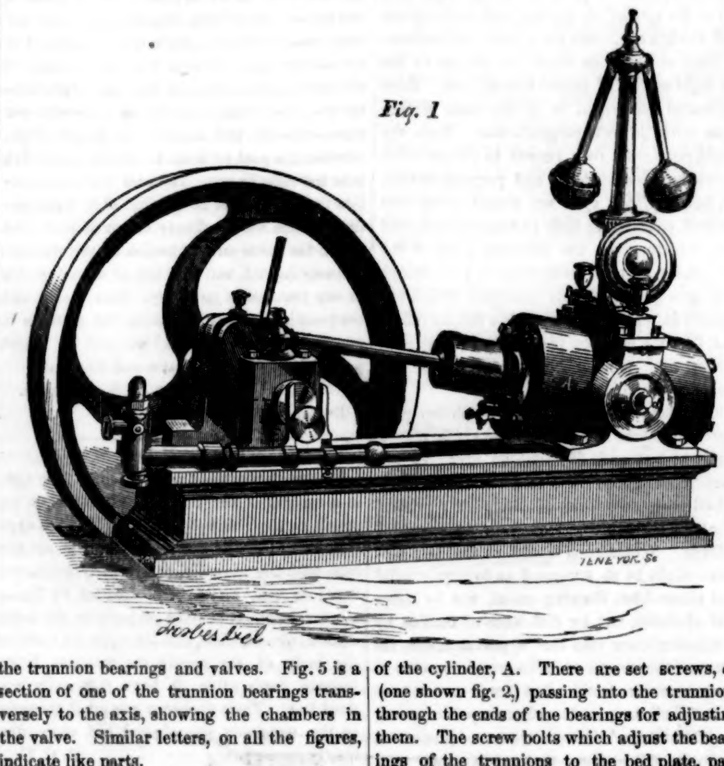
REED'S PATENT OSCILLATING ENGINE.

The accompanying engravings represent the improvements in oscillating engines for which a patent was granted to J. A. Reed, of this city on the 9th of last January, and patented since in France and Great Britain.

The nature of the improvement consists in arranging and placing the valves and the steam ports of the engine on each side of the cylinder, around the trunnions, to let the steam in on both sides of the cylinder at the same time, and at opposite points, so as to balance the pressure, and prevent the severe friction caused by letting in the steam on one side only. Also making the trunnion bearings of the engine adjustable by set screws, so that the trunnions may be accurately adjusted to their seats.

Fig. 1 is a perspective view of the engine, and fig. 2 is a transverse section of a portion of the cylinder, one trunnion, and the induction and eduction steam passages. Fig. 3 is a side view of the cylinder with the bearing removed, showing the ports. Fig. 4 is a face view of

Fig. 1



the trunnion bearings and valves. Fig. 5 is a section of one of the trunnion bearings transversely to the axis, showing the chambers in the valve. Similar letters, on all the figures, indicate like parts.

A is the cylinder, and B the trunnion bearings, which also constitute the valves. *a a* are induction pipes passing through the tops of the trunnion bearings. *f f* are openings in the valve through which the steam passes into the ports of the cylinder. *g g* are openings through which the steam passes from the ports of the cylinder to the eduction pipes, *b*. at the bottom of the trunnion bearings. *e e* are partitions in the trunnion seats dividing the induction and eduction chambers in the valves. *c c* are the ports in the valve seat, and *d d* are the trunnions of the cylinder, A. There are set screws, d', (one shown fig. 2,) passing into the trunnions through the ends of the bearings for adjusting them. The screw bolts which adjust the bearings of the trunnions to the bed plate, pass through slots, which thus admit of the bearings being moved to adjust the conical seat, *i*, to the trunnions.

As the cylinder oscillates on its trunnions, it successively brings the induction corresponding passages of the steam chamber and cylinder, and those of the exhaust pipe and cylinder into communion, to let in and exhaust the steam; and this is done with the like adaptations on both sides of the cylinder, each trunnion box being alike. The steam is then let in under the piston from opposite sides at once,

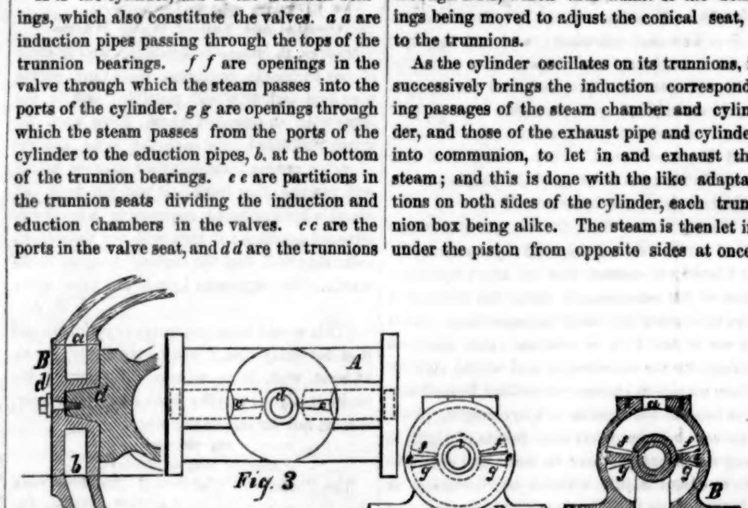


Fig. 2 Fig. 3 Fig. 4 Fig. 5

by two passages, and is exhausted in the same manner, the cylinder cutting off and exhausting the steam through its trunnion boxes as it oscillates. The manner of thus arranging and placing the steam ports and valves on or around the trunnions on each side of the cylinder, must meet with much favor.

The object of adjusting the seat of the trunnions by screws, d', is evident, viz., to make all the steam joints work close and tight. Two of these engines have been on exhibition at the Paris Exhibition; one about 15-horse power, and the other somewhat less. They have received much praise for the principles involved in their construction, and the beautiful manner in which they have operated on all occasions when running. Mr. Reed has devoted much time and attention to the steam engine, and has been very successful in making a number of very useful improvements.

More information respecting the above engine may be obtained by letter addressed to Reed & Tousley, 95 Maiden Lane, this city.

Adams' Patent Implement for Boring Wells.

The annexed figures represent an improvement in implements for boring wells, for which a patent was granted to I. J. W. Adams, of Sharptown, Somerset Co., Md., on the 30th of last Jan. Fig. 1 is an elevation of the implement, and fig. 2 is a vertical section of the boring tool or auger. Similar letters refer to like parts.

The nature of the invention consists in the employment or use of a spring attachment applied to an auger or borer, arranged as will be hereafter fully shown and described, whereby said auger or borer is held in its proper position while being operated, and at the same time allowed to be turned so as to be emptied of its contents.

A, fig. 1, represents a vertical post firmly secured in the ground; the hight of this post should somewhat exceed the depth of the hole to be bored. B is a cross-piece framed to the top of the post A, and having a pulley, *a*, at each end. C is a rope or chain which passes over the pulleys, *a a*, and has a weight, D, attached to one end E, is the shank or pole of the auger, the upper part of which is attached to the end of the rope or chain, *c*, opposite to the end to which the weight, D, is attached. To the lower end of the shank or pole, E, there is permanently secured a bail, F, of semicircular form, to the lower ends of which there is secured by pivots, *b b*, a cylindrical vessel, G, having a spur, *c*, at the center of its bottom, and a cutting edge, *d*, and an opening, *e*, which extends from the spur, *c*, to the edge of the bottom of the vessel. The lower ends of the bail are attached to the upper edge of the vessel, G, which, with its spur, *c*, and cutting edge, *d*, on its bottom, form a hollow auger or borer. The auger is provided with a semicircular handle, *f*, to one side of which there is secured one end of a spring, *g*, which is also of semicircular form, and having a knob or projection, *h*, on its outer surface, which knob or projection, when the auger is in an upright position, fits in a corresponding cavity in the under side of the bail, F, and keeps the auger

Fig. 1

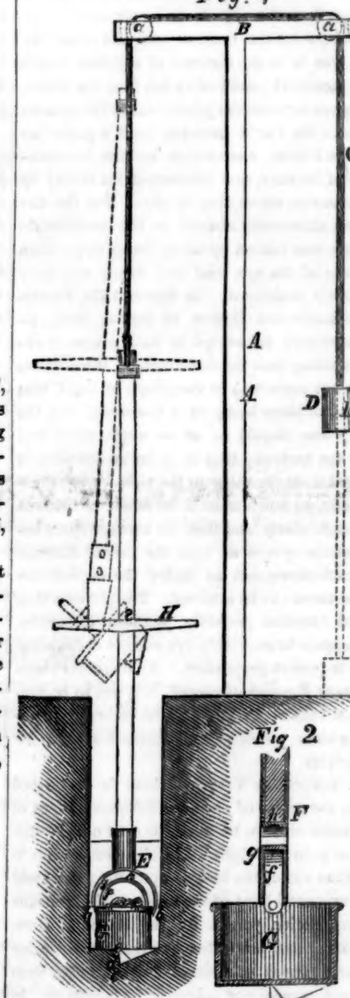


Fig 2

in its proper position. H is a handle on the shank or pole, E, said handle being allowed to move up and down on the shank or pole, and prevented from turning upon it by a key, *i*.

OPERATION.—The operator turns the handle, H, and thereby rotates the shank or pole, E, and auger, G, which works its way into the earth by cutting and forcing the earth within it through the opening, *e*. A few revolutions of the handle, H, is sufficient to fill the auger, when the shank or pole and auger is raised by the operator, the weight, D, by its gravity assisting. The auger is raised to the surface of the earth, or a short distance above it, and the operator grasps the outer end of the spring, *g*, and depresses it, thereby drawing the knob or projection, *h*, out of the cavity in the bail, and the auger is then turned or inverted, swinging upon the pivots, *b b*, and its contents fall out, as shown by the dotted lines, fig. 1, the auger readjusting itself. The auger is then replaced in the hole and the above operation repeated until the hole is made the required depth.

More information may be obtained by letter, addressed to the patentee, at Sharptown.

Scientific American.

NEW-YORK, OCTOBER 13, 1855.

Water for Cities.

A plentiful supply of good wholesome water is just as necessary for the health of individuals and families, in city and country, as a bountiful supply of pure air. In many places, however, it becomes an expensive matter to obtain a sufficient quantity of it, but however great the expenses may be, these must and should be incurred. Unlike a certain kind of food which may become scarce, and its place supplied by another kind, no substitute for watter can ever be invented or discovered. It forms three-fourths of the weight of our bodies, and the food of our daily meals, and without plenty of it, there can neither be health, cleanliness, nor cheerfulness, in any family or community. In villages where the houses are scattered widely apart, wells in the earth, or cisterns of filtered rain water, are generally found sufficient for the supply of the people; but these become inadequate to fulfill the sanatory conditions of life, when street after street becomes packed with huge buildings, and a dense population; hence some other mode of supply becomes imperative.

At the present moment, various cities and villages in our country seem to be sensibly agitated with regard to procuring supplies of good water. We have now before us a report upon a supply of water for Baltimore, by G. H. Bryson, C. E., and two keen pamphlets, controversial in their character, on providing water for the city of Brooklyn. Beside these, we have lately received letters from various correspondents in relation to supplying certain villages with water.

It is certainly very desirable to know what is the cheapest method of supplying a city with water. Happy, let us say, is that city which can obtain an abundant supply—even although the distance be considerable—by gravitation, for it is indeed an expensive matter to force water from a low to a high level for distribution. Where water is supplied naturally from an elevation, the dams, reservoirs, and conduits are the only great items of expense; to these expenses must be added the engines, and the means of continually working them, when water has to be raised from a low to a high level. But for all these expenses, many cities are thus supplied, both at home and abroad. This is the case with Philadelphia, Pa., Jersey City, N. J., Chicago, Ill., and Cleveland, Ohio, all of which find it for their interests and welfare thus to supply themselves. Steam is the power, used, and Cornish engines are employed in all of these cities, with the exception of Philadelphia, which uses both water power and a Cornish pumping engine—the former being derived from the Schuylkill river, acting upon immense wheels; the latter being the latest introduction, and found, as we are informed, to be the most economical. The city of Glasgow, in Britain, once supplied by water pumped with Cornish engines from a distance of three miles, has found it to be more economical to conduct water by gravitation from a distance of twelve miles. These two facts are worthy of consideration by all cities which are seeking greater supplies of water. The city of Baltimore is fortunate in being able to obtain a large supply of water by gravitation; the city of Brooklyn has not the like sources of supply. The Croton water might be conducted from Manhattan to Long Island by two large pipes, the one to be a safeguard in case of danger in the river, to the other; but such an enterprise, by many, has been looked upon as too hazardous.

It is asserted that plenty of water can easily be collected on Long Island to supply a city with half a million of inhabitants; if this is so, the citizens of Brooklyn should do something more for obtaining that supply than merely making one or two surveys, and expending column after column of ink, year after year, as they have been doing on the subject. The engineering appliances are at hand, ready and able to execute their wishes successfully; it is for them to call them into action.

It is a shame that a city like Brooklyn should have no better means of a general water supply than the public wells.

Free Night Schools.

Free Schools during two hours of five evenings every week are now open in New York and Brooklyn, and will continue for three months. Their object is to afford the means of a better education to young men and women who are engaged at work during the day, and who, from circumstances beyond their control have been compelled to work for a living before they acquired the rudiments of a common education. No young person in this community can plead inability in obtaining a good common education, for the means to obtain such are provided for all. We regret to say, however, that too many young persons, at least those who are, in a measure, their own masters during evening hours, have no honorable ambition to acquire a good and solid education,—hence such noble institutions as Free Schools have less attraction for them than theatres, ball-rooms, and places of amusement. It is also true that those who toil severely all day long, naturally seek for amusement rather than study during spare hours; and this is the case more especially with the most ignorant, the very ones who most require a better education. We therefore hope that all those who employ young persons of a very limited education will use their influence in exhorting them to attend these schools. The teachers of Evening Schools, we hope, will remember that their instructions should be blended with great cheerfulness and kindness, so as to win the attention and affection of their scholars. We hope the master-mechanics will urge upon their apprentices and the young men in their employ the benefits to be obtained from attending these schools. We have known several mechanics who have arisen to distinction for great knowledge, and who had no other means of acquiring an education but by Evening Schools.

New Paper Material.

A correspondent has sent us some samples of a wild plant obtained in Maine, which he considers might be profitably used as a substitute for rags in the manufacture of paper. The samples sent us are very long and strong in the fiber, and resembles flax in appearance. Paper can be made of almost any vegetable substance, but the simple question is one of economy, viz., "of what substance can it be made cheapest?" We have no doubt but beautiful thread and cloth could be made from the material sent us by our correspondent, and it would be well if the ingenuity of our inventors were directed to improvements in processes and machinery for making new fabrics out of new materials, of which, no doubt, many might be profitably cultivated, or gathered wild, in various parts of our country. Cotton, silk, wool, and flax may be said to constitute all the raw materials used in our textile manufactures. In the name of "progressive improvement" let us have a little more variety than the four substances named. Cotton and flax are both vegetable substances, but the fabrics produced from them are entirely different in character. We are confident that a dozen substances—differing as much from one other—might be obtained from sea and land grasses, and the bark of trees, to produce as many different fabrics, all of which would find a sale in the market, owing to the great variety of tastes prevailing.

The Famous George Law Muskets.

We learn from good authority that the Russian Government has purchased the above firearms—100,000 old U. S. muskets, we believe—and that the same are now in process of alteration into semi-Minie rifles at Colt's establishment, Hartford, Conn. It is a singular fact that the chief belligerent parties in the present European war have come to the city of Hartford, Conn., to obtain their best arms. Messrs. Robbins & Lawrence are turning out over 1000 rifles per month for the Sharp's Rifle Co., of that place, on an English contract, besides a large quantity of other arms. Extensive additions have been made to their works by the erection of new buildings, and if the war continues, further extensions will be made.

The steamship *Adriatic*, now being built for the Collins line of steamers, will be, when completed, the largest and most magnificent vessel afloat. She will measure five thousand six hundred tuns; her length will be three hundred and forty-five feet on the broad line; depth of hold thirty-three feet; breadth of beam fifty.

Reminiscences of the Paris Industrial Exhibition.

STEAM ENGINES—Many persons suppose that the French people know but little about steam engines, and that their number is very limited in France. This is a mistaken idea, for steam engines of remarkable beauty, and in great numbers, are made and used in that country. While in Paris, those exposed in the grand Exhibition impressed us favorably, both with regard to the simplicity of their character, and the highly cultivated taste displayed in their style of execution. The favorite and most common steam engine used in France is the double horizontal kind, that is, two cylinders yoked at right angles to one shaft. They are mostly low pressure and condensing; the pumps and condenser are placed below, and are worked by eccentrics from the main shaft, and thus they are very compact. The engines of the river boats are of this construction, and a number of these were on exhibition, but not a single large marine one. Some small ones, however, were on exhibition, and one of 30 horse power, as a working model, by Tod & McGreggor, of Glasgow, Scotland, of the steeple class, was well made, but we did not like it; we prefer greater simplicity, such as is now attained in the marine engines built in New York. M. Gache, of Nantes, exhibited a double horizontal river boat engine, and so did M. Creusot, the largest maker of this class of engines in the country. One from Holland, by M. Cail, was justly admired for its workmanship, and gave evidence of the mechanical skill of the genuine Dutch. An engine from Birmingham, England, gained more notice for its elaborate finishing than most of those exhibited, but it did not show such harmony of proportion and skillful arrangement of parts as those made in France. All the large engines for factories in France have double cylinders, and are said to insure perfect steadiness and regularity in working the machinery. Some very large ones of this class were exhibited, but the most unique, for the purpose of insuring a smooth motion, was a small engine having three cylinders with their piston rods so yoked as to overcome all the difficulty of *dead points*. Three cylinder engines are not new, nor are they commendable, as two cylinders can accomplish the same objects with sufficient accuracy, and are certainly much cheaper. We did not attempt to count all the engines exhibited; their number was too imposing for this task.

The French locomotives in contrast with the English ones—and there were quite a number of both—exhibited superiority both in construction and finish. This surprised us not a little, as we did not expect to find such engineering excellence in France, especially when compared with the parent country of the locomotive; but when we remembered that M. Seguin, of the St. Etienne Railway, first greatly increased the heating surface by his tubular locomotive boilers, patented in 1828, and that M. Pelletan early applied the steam jet to increase the draft of the fire, we could not but admit that too little credit has been given to France for what she has done to improve the steam engine. The French locomotives did not appear to be any better than the English ones, but while they exhibited as much power, they displayed a greater artistic finish and beauty of design. Both English and American engineers might learn a lesson from those of France, with respect to combining beauty with usefulness in designing machinery.

France, like all other countries, has her enthusiasts, and perhaps in greater numbers.—We thought so while looking at an engine by M. Paschal, propelled with steam, smoke, and hot air, and which has made nearly as much noise in Paris as the *Ericsson* did in New York. Air is forced in small jets through an annular furnace, surrounded with water on the outside, where the steam is formed, and from which it is taken to mingle with the heated air and products of combustion of the furnace, thence into the cylinder to operate the piston. The working cylinder itself is also heated by a grate, but all the other parts of the engine are the same as those in common use. Its results, so far, have not come up to the anticipations of its admirers and advocates, and never will.—It, however, shows that the French engineers are not of the stand-still order. Without such experiments no improvements could ever be made.

IRON AND STEEL—The display of iron and steel manufactures greatly interested us, more especially the productions of Prussia. As at the World's Fair in London in 1851, so at the Great Exhibition in Paris, 1855, M. Krupp, of Berlin, Prussia, made by far the finest display, surpassing both the French and English steel and iron makers. The Exhibition in London must have done good, for those who witnessed it have confessed that M. Krupp has improved upon his samples of fine steel there exhibited, and it will not be forgotten how these were admired and spoken of. His iron books, with leaves thin as paper were described as the most wonderful achievement in the science of iron making. We must confess that it was impossible to ascertain whether France, Germany, or England occupied the first place for iron products, so far, however, as it relates to commercial utility—cheapness of product—England surpasses all the others, but the products of each—taking a general view of them—were nearly alike, massive and beautiful. There were huge iron rails 60 feet long, and iron girders of equal length. There were iron plates for the new French gun boats, 30 feet long, 6 feet wide, and 4 inches thick, made by M. Cave & Co., and intended to knock down with impunity the granite walls of fort and citadel. There were also displayed sheets of iron 30 feet long, and as many wide, and M. Petin & Co., displayed steel tires for locomotive wheels 15 feet in diameter. The wheel adopted on all the French lines of railroads is composed of a corrugated steel disk bound to a steel tire, and a solid hub pierced for the axle. These are stated to be cheaper and stronger than any other kind—the cheapness having reference to durability. One large wheel 18 feet in diameter, forged wholly of iron—nave, felly, and spokes,—exhibited by a M. Gouin, attracted much attention for its huge proportions, and the massive machinery required to forge it. We were not prepared to see such masses of iron forged into wheels, beams, and plates, but the Titan power of steam is equal to the task. Those on exhibition were worth a voyage across the Atlantic to behold.

Fair of the American Institute.

This exhibition opened on the 4th, at the Crystal Palace, as previously announced, but the articles were so illy arranged, we concluded it best to defer our remarks on the merits or demerits of the products displayed until next week.

There is a good prospect that the Fair this year will be the best the Institute has ever had, but it will be some days before order and system prevails throughout the building. The Exhibition will be kept open during the entire month, and next week we shall devote considerable space to the subject, and continue it from week to week till the Fair closes.

Carpenter's Rotary Pump is advertised in another column. It is a good one. Reader, just refer to the pungent manner in which the advertisers speak of its merits.

An article on the encroachments of the Patent Office by the Secretary of the Interior, prepared for this number, is unavoidably crowded out. It will appear next week.

SPLENDID CASH PRIZES!

The proprietors of the SCIENTIFIC AMERICAN will pay in cash the following splendid prizes for the fourteen largest list of subscribers sent in between the present time and the 1st of January, 1856; to wit:

For the largest List	$100
For the 2d largest List	75
For the 3d largest List	65
For the 4th largest List	55
For the 5th largest List	50
For the 6th largest List	45
For the 7th largest List	40
For the 8th largest List	35
For the 9th largest List	30
For the 10th largest List	25
For the 11th largest List	20
For the 12th largest List	15
For the 13th largest List	10
For the 14th largest List	5

Names can be sent in at different times, and from different Post Offices. The cash will be paid to the order of the successful competitor immediately after the 1st of January, 1856.—Southern, Western, and Canada money taken for subscriptions. Post-pay all letters, and direct to

MUNN & CO., 128 Fulton st., New York.

☞ See prospectus on the last page.

Gunpowder, Percussion Powder, and their Substitutes.

The following is the substance of a most able and interesting paper recently read before the Royal Society, London, on the above interesting subject, by Dr. Gladstone, an able chemist, who has devoted much attention to the question:

"Any great and sudden increase of volume may give rise to the phenomena designated explosion; but such great and sudden increase never takes place by the mere dilatation of a solid or liquid body; it is always necessary that gases should be formed. The simplest form of explosion is when a liquid is suddenly converted into a gas, either by the removal of pressure, or by the bursting of the vessel in which it was contained. The enormous expansion of gas by the removal of pressure is taken advantage of for the projection of missiles in the air gun, and in Perkins' steam gun. In these cases there is no chemical change; but usually an explosion is the result of a rapid chemical action between the different constituents of a mixture, or chemical compound, by which substances are produced that occupy a very much larger space than the original combination did. Such an explosion is always attended with heat, and generally with light and noise. The substance exploded may be a mixture of two or more gases; for instance, if the fire-damp of the mines be set fire to in the air, it burns quietly enough with a luminous flame; if, however, it be previously mixed with air, on being ignited the flame passes instantly throughout the whole mass; and if mixed with twice its volume of oxygen, this takes place with great violence and a loud report. One atom of carburetted hydrogen combines with four atoms of oxygen to form carbonic acid and water. In this case, however, the gases produced by the explosion would actually have occupied less space than the original mixed gases, and a positive contraction would have ensued, had it not been for the high temperature at which they were formed. In order to obtain very great expansion we must not start with a gaseous mixture. Solid or liquid oxygen is a desideratum, but it can be procured in that condition only when in a state of combination. There are several salts which contain a large quantity of this element, and which give it up with great facility—the nitrates and chlorates of potash or soda, for instance.

In exploding, gunpowder produces carbonic acid and nitrogen gases, and sulphuret of potassium, which is also dissipated by the great heat evolved, and if it reach the air is converted into sulphate of potash, giving rise to the white smoke that follows the explosion. Besides these gases, some others are always produced in small and varying quantity. It is supposed that, at the moment of explosion, the heated gases occupy fully 2,000 times the volume of the original powder. By mixing different combustibles with nitre, various effects may be produced on explosion; sometimes the light, sometimes the heat, and sometimes the noise, being the most remarkable. When nitre was an article of scarcity in France, the French chemists made many experiments with a mixture of chlorate of potash, charcoal, and sulphur; but this compound, though a good explosive, has several disadvantages, which have prevented its ever coming into extensive use. A white gunpowder has more recently been prepared by mixing chlorate of potash with yellow prussiate of potash and sugar. The explosives hitherto described are all mixtures. There exist substances which contain all the elements of combustion within themselves, and which require only a slight elevation of temperature, or a smart blow, to alter their state of chemical combination, and suddenly to produce gaseous bodies in large quantity. Preeminent among these is gun-cotton, a substance formed by immersing cotton in a mixture of nitric and sulphuric acids.

It is generally allowed now that this compound consists of lignine, C.24, H.20, O.20, in which a portion of the hydrogen has been replaced by N.O.4; difference of opinion exists as to the amount so displaced, but Dr. Gladstone had found it to be five atoms in the most explosive gun-cotton, three in that of inferior quality, which he designated cotton-xyloidine. The most explosive compound produces a sudden flash, but no smoke or loud noise, and leaves no residue whatever. Hydrocyanic acid is among the resulting gases. Nitroglycerine, a liquid produced in a similar manner from glycerine, is of so explosive a nature that if a single drop be struck by a hammer on an anvil, it gives rise to a deafening report. Its composition is C.6, H.5, 3 (N.O.4,) O.6. Similar to this is nitromannite, which also explodes by percussion.

(Concluded next week.)

Recent Foreign Inventions.

PRESERVING MEAT—Jean Wothly, of Zoffinger, Switzerland, has obtained a patent for the following method of preserving meat: The meat is first cut into pieces of about ten pounds in weight, and separated from the bones.—These are then dusted over with sugar and salt, and allowed to stand about two days, and are then subjected to pressure, in order that all the blood and serous matter may be forced out; or in place of being pressed, they are moderately cooked before packing. They are then placed in casks lined with melted fat. Each piece is covered with a piece of white paper well greased, packed in the barrel, and fat is poured in to fill up the spaces between the pieces. This meat cask is then closed, and placed within a larger one, and the space between the two filled up with sand, which is a good non-conductor. This is certainly a novel method for preserving meat. It is stated to be good, but troublesome. Part of the plan might be tried by some of our farmers in laying down their winter beef, viz.: all but the partial cooking and packing in a double barrel.

PRESERVING MEAT AND VEGETABLES—Geo. Nasmyth, of Kennington, England, has taken out a patent for boiling cans, containing meat, (and which are afterwards to be soldered up tight,) in a fluid such as alcohol, which boils below the heat of water—212 degs.—in order to expel the air—an absurd idea.

COMPOSITION FOR SHIP'S BOTTOMS—Thomas Harrison, of Hackney, England, ship owner, has taken out a patent for the following composition to cover the bottom of ships, and which may be very useful for coating spiles for wharfs, such as those in San Francisco, where the ravages of the ship worm are exceedingly destructive. In an iron vessel 35 parts by weight of pitch are melted, to which 35 parts of fine ground chalk are added. These are first well mixed by stirring, then 25 parts of ground barytes, and 5 of sulphate of copper are added, and well mixed together. The whole is then allowed to cool to 100 degs. Fah., and as much crude naphtha, or spirits of turpentine, is put in it as will render it fit to be put on easily with a brush. It is applied while warm. It is rather remarkable that a great number of patents have been taken out in England during the past two years, for such compositions, while in our country, although as largely interested in obtaining a good coating for ship's bottoms, no attention seems to have been given to the subject.

CARTRIDGES FOR FIRE ARMS—Capt. John Norton, of Dublin, Ireland, has obtained a patent for the use of fulminating powder as a priming for cartridges, to cause an explosion through the unbroken cartridge case; also for puncturing the case of cartridges at the base, to enable the charge to be ignited from the flame of the cap of the nipple. This latter part of the invention is the same as that embraced in the Marston American cartridge, illustrated on page 129, Vol. 8, SCIENTIFIC AMERICAN.

DESTROYING THE VAPORS OF BOILING OIL—F. W. East, of London, has taken out a patent for arranging the furnaces and flues of a boiler for boiling bones, or oils, or other matters that give off noxious vapors, so that by means of a fire in addition to that employed to heat the boiler, a draft is established to induce currents of air to flow over the surface of the boiler to mingle with the oil vapor, and be then conducted under the secondary fire, where they are burned. A plan similar to this was tried in this city some years ago, in order to remove the nuisances of noxious vapors, arising from some bone boiling establishments. The vapors were caught by a bell mouthed cap, and conducted by a pipe into the furnace. It was stated to be perfectly successful, and yet, so far as we know, it has never been carried out into general practice.

PORTABLE COOKING APPARATUS—The London *Mechanic's Magazine* states that J. E. Gardner, of London, has obtained a patent for an ingenious arrangement of all the various utensils required for boiling and frying, so that they may fit closely into one another, and be compactly stowed into a small leather case. With these there is also a cooking lamp, so as to enable sportsmen or travelers to carry about with them the means of cooking their food in a Christian-like manner, in wood or wild. These little knick-knacks sometimes form very profitable patented articles, for they are both useful and necessary to a very large class of persons in every country.

Notes on Sciences and Art.

GOLD IN THE ARTS—It has been ascertained that in Birmingham, England, not less than one thousand ounces of fine gold are used weekly, equivalent to some $900,000 annually; and that the consumption of gold leaf in eight manufacturing towns is equal to five hundred and eighty-four ounces weekly. For gilding metals by electrotype and the water-gilding processes, not less than ten thousand ounces of gold are required annually. A recent English writer states the consumption of gold and silver at Paris at over 18,000,000 of francs. At the present time the consumption of fine gold and silver in Europe and the United States is estimated at $50,000,000 annually.

RETURN OF THE GREAT COMET—The eminent astronomer, M. Babinet, member of the Academy of Sciences, and M. Bomme, of Middleburg, Holland, have been making some interesting investigations in respect to the return of the great comet which appeared in the years 104, 392, 682, 975, 1264, and 1556. M. Bomme has gone over all the previous calculations, and made a new estimate of the separate and combined action of all the planets upon this comet of three hundred years, the result of which severe labor gives the arrival of this rare visiter in August, 1858, with an uncertainty of two years, more or less.

MICROSCOPIC PHOTOGRAPHS—Some microscopic photographs exhibited at Manchester, England, have excited much admiration. One of the size of a pin's head, when magnified several hundred times, was seen to contain a group of seven portraits of members of the artist's family, the likenesses being admirably distinct. Another microscopic photograph, of still less size, represented a mural tablet, erected to the memory of William Sturgeon, the electrician, by his Manchester friends. This little table covered only 1-900th part of a superficial inch, and contained 680 letters, every one of which could be distinctly seen by the aid of the microscope.

THE READING BRICKS OF BABYLON—According to the Leeds (English) *Mercury*, Col. Rawlinson has just discovered among the ruins of ancient Babylon an extensive library—not, indeed, printed on paper, but impressed on baked bricks—containing many and voluminous treatises on astronomy, mathematics, ethnology, and several other most important branches of knowledge. These treatises contain facts and arguments, which, in his opinion, will have no small effect on the study of the sciences to which they relate, and, indeed, on almost every branch of learning, and which throw great light upon Biblical history and criticism, and the history of our race.

Machinists in Cuba.

During the sugar cane season in Cuba, say from November to April, there are usually employed on the various plantations about twelve hundred machinists as engineers and repairers. Few of these machinists are Cubans, and few of them remain the whole year on the island. A large number are Scotchmen, a few English, while the United States furnish a large share. These machinists repair to the island during the month of October, and secure situations usually at most excellent wages, and then remain until May, when they leave the island and spend the warmest weather in a more healthy climate. Not a few have families who remain in the United States. For years the demand for machinists in our own country has been so great, and the prices paid for labor so good, that the higher rates paid in Cuba have no been sufficient to entice very many to so warm and unhealthy a climate. There are some twenty or thirty residing in South Boston, however, who have every year for several years visited Cuba, and spent the working season.—[Boston Traveller.

Singular Cause of Leak in a Vessel.

The schooner *Shooting Star*, of Gloucester Mass., was recently taken upon a marine railway at that place for the purpose of discovering the cause of a considerable leak in her bottom, when a piece about one foot long and eight inches wide was found to be worn as thin as a wafer. On removing the damaged plank, originally two inches thick, two pebble stones, rather larger than a hen's egg were found, and their constant rolling with the motion of the vessel had thus nearly worn through the thick oak plank when they were fortunately discovered.

This simple cause of leakage—two pebbles—might have been the means of sinking this vessel in the ocean. Small dangers should never be overlooked nor despised.

Military Uses of the Daguerreotype.

The Glasgow (Scotland) *Herald* states that the commander of the British militia troops in Lanarkshire having lost a considerable number of men from desertion—the majority of whom make their way to Glasgow, after they have received part of their bounty and necessaries—has hit upon a capital auxiliary to identification. So soon as they are clothed, the likenesses of the men are taken by daguerreotype in groups of half a dozen, upon one plate; the picture is fidelity itself. When a man disappears from Lanark, therefore, the plate upon which his physog is imprinted is sent down to Glasgow, where it is shown to the recruiting serjeants for the regiment, who, having the portraits in their remembrance, can look after the man as if he had been an old acquaintance.

Uses of the Telegraph.

The electric telegraph is becoming more and more useful. A peasant received lately, by mail, a letter from his son Joseph, a Zouave before Sevastopol. The young man mentioned the fact that his legs were yet whole, but that his shoes were the worse for wear. The affectionate father having purchased a pair of nine-and-a-halfs, was perplexed as to the means of forwarding them. At last he thought of the telegraph—the line to Marseilles ran through his village. He put the address on one of the soles and slung the shoes over the wire. A pedlar passing by, struck by the solidity of their workmanship, appropriated them, placing his used-up trampers in their place. The next morning the old daddy returned to the spot to see if the telegraph had executed his commission. He saw the substitution which had been effected. "I vow," he exclaimed, "if Joseph hasn't already sent back his old ones!"—[Paris correspondent N. Y. Times.

Atmospheric Air Necessary for Decomposition.

The presence of atmospheric air or oxygen appears essential to the first development, if not to the continuance of nearly all of decomposition. Meat, vegetables, and indeed most organic substances can be kept from the atmosphere for years. Eggs lose their property of absorbing oxygen by immersion in milk of lime; the small amount of carbonic acid contained within the shell uniting with the solution of lime that penetrates into the pores of the shell, and forming an insoluble carbonate, choking up all the apertures by which air can enter. Eggs have been found sweet after being kept in this manner over three years. Wood sunk several feet beneath the surface of the peat bog is preserved from decay, the oxygen absorbed by the organic matter above it not being able to reach it.

Newspapers in the World.

The following is supposed to be the number of newspapers in the world: 10 in Austria; 14 in Africa; 24 in Spain; 26 in Portugal; 30 in Asia; 65 in Belgium; 85 in Denmark; 50 in Russia and Poland; 350 in other Germanic States; 500 in Great Britain and Ireland; and 2,000 in the United States, or nearly twice as many as in all other nations.

TO CORRESPONDENTS.

H. D. B., of Mass.—You will remember that every additional saw will require an increase of power. A hundred saws can be used for sawing stone. There is no difficulty in arranging them to work, but more power is required, and this is an objection.

S. C., of Ct.—Your speculations savor more of folly than they do of common sense. If we are wrong, you are very far from being right. The personal remarks are badly conceived.

G. C. C., of Ohio—If you will send us a sketch and description of your improved apparatus for raising water we will examine, and report our opinion upon it.

J. D. S., of Ohio—We do not find time to attend to such commissions.

M. C., of Ct.—It would take a pretty large fish hook to catch a whale. You do not state how you propose to induce them to bite. There are but two species of whales captured for their oil. The sperm whale has a tremendous head, with a small lower jaw, on which large ivory teeth are arranged. They have no upper teeth, but in lieu thereof cavities, into which the under ones fit. The other species, called the right-whale, has a very large mouth, but no teeth, so to speak. The substitute for them consists of the long slabs of whalebone fringed with a substance resembling hair. These slabs hang down vertically from the roof of the whale's mouth; his food consists of the insects floating in the water, which adhere to the hair fringe.

C. K., of O.—Balsam of sulphur is nothing but a solution composed of olive oil mixed with sulphur. You can easily make it The odor is very disagreeable.

G. McC., of N. B.—We could not advise you to apply for a patent on an apparatus that will only be able to record five thousand letters per hour by telegraph.

W. C. D., of Key West—Some information about cleaning Sisal hemp would be valuable, in order to know the difficulties to be overcome by a machine.

C. D. M., of N. Y.—Your excellent list of subscribers have been entered on our book. The machine for which you have applied for a patent is a good one we presume, but we cannot say what the result will be. The competition is almost as fierce as the late assault upon Sevastopol.

B. C. C., of Tex.—Pressure has been applied with success to the casting of metals, to increase their density.—Fairbairn instituted many experiments. The cause you mention for the bursting of guns is no doubt correct, but the breech is considered the part on which the greatest pressure is exerted, and practically this has been found to be the case. It has not yet been proven that the Russians have superior guns, except in the quality of cast metal. Banded wrought iron guns have been tried without success.

B. T., of Ind.—Ingenuity has been active for years in improving flax dressing machinery. In the machine to which you refer, the scutching board is placed above the center of the axle, and the heckle is composed of steel wire. The scutching is done with a rotary metal disk with brushes fitted to it. Send us a sketch of your machine, and we will examine it.

C. C., of M.—Improvements in making clay ware have been patented here within eighteen months, which consist in expelling the gases of the slag by piercing and pressure during the presence of the fused slag in the mold, and in subsequently submitting the molded slag to the action of an annealing furnace,all in order to prevent the cracking of the product.

E. A., of Pa.—Horse shoes are made by machinery. There are a number of patents for this purpose. If you wish your plan examined, send us a sketch and description of it.

D. M., of R. I.—An instrument to indicate the number of yards woven by a loom is not new. Such devices are in use.

G. L. Grier, Milford, Del.—Wishes to procure the address of a manufacturer of plow handles.

H. V., of N. Y.—A hollow tube made of tin, with flanges attached for coring and quartering apples, is not a new device; we have seen the same thing.

C. C., of N. C.—Vacuum pans are now very generally used for boiling the liquid sugar. The system formerly used was to boil it in large open pans, at a temperature of about 240 degs. Fah. The crystallization could only be partially obtained, and in consequence much injury was done to the sugar. The vacuum pan has been used a great many years.

A. E., of Vt.—The manufacture of earthenware is not a very important branch of business here. We import an immense quantity of cheap ware from Great Britain, where it is largely made and cheaply furnished. In glazing ware, the vessels, after they are immersed in the liquid, should be placed into close boxes, so as not to allow the flame to touch them. Care should be taken to equalize the heat through the kiln in the process of melting the glaze.

L. S. P., of N. J.—The word Avoirdupois is of French origin. How it became so universally adopted we can scarcely tell. It signifies "to have weight," and is written in French as follows: "avoir du pois."

L. B. P., of Ohio - We do not remember to have seen a corn planter that embraced the features contained in yours, and we therefore think there is a chance for a patent on it, but you should bear in mind that many inventions have been made for the same purpose.

J. A. B., of N. J.—The sketches of your copying presses have been examined. The only press we find patented that in any way seems to interfere with yours, is that of A. A. Wilders, patented March 11, 1851. Your method of operating the folding plates is different from Wilders, and you can doubtless sustain a claim upon it.

S. J. W., of Mich.—The sketch of your water wagon has been examined: we do not discover in it anything upon which a patent can be secured. Neither do we regard it as possessing sufficient utility to justify any expense in an attempt to patent it.

H. L. S., of Vt—The Patent Office will not grant patents for marble saws unless they are original inventions. Where there are two or more applications that embrace the same features, the Office declares interferences, and the applicant that proves to be the original inventor will have the patent granted to him.

E. W., of Mich.—It is very difficult for us to judge of the novelty of a plow improvement without a suitable model of it. This you had better make and send us.

P. S. B., of N. H.—The brake of Mr. Brown has been examined: the arrangement appears to be new, and we should think a patent could be secured for it. If he has made no oath of allegiance to a foreign power he is still entitled to all the privileges of a citizen. The patent fee would be $30.

B. F., of Ohio—In the great marble saw race all sorts of arrangements and all sorts of saws have been invented. Your ideas are not new. If you have more than one claim in your patent you have a right to license out one claim without the whole right.

A. G., of Mass.—We gave it as our opinion that it would be no infringement on your wrench, to apply the principle to a chuck or vise. You patented an improved wrench and not a specific mechanical device independent of its uses.

A. Q., of N. Y.—Mr. B. delivered your model; a new model and a new application entirely will have to be made on your engine in order to secure the arrangement you describe.

A. L. J., of Vt.—Yours has been received and will meet with attention.

J. M. C., of Boston—Your syphon will not operate. When the valve is opened at the top of the curve, the pressure of the air will counterbalance the ascending column of water and cause it to cease flowing.

G. W. R., of Ky.—There are various brick presses in use, and their object is to make bricks of superior character and cheaper than by hand. The tempered clay is taken comparatively dry, and submitted to severe pressure in the molds and then discharged. They are stacked and burned like common brick. On page 24, Vol. IX. Sci. Am. the brick kiln of Mr. Smith, of Baltimore, is illustrated. He manufactures bricks with machines of his own invention. You should examine some brick presses in operation; this might save you both toil and expense

S. E., Jr., of S. C.—The article to which you refer must be a mere notice of the French method of making salt. This is done by solar evaporation in long pans. The salt is made very slowly, but it is of the best quality.

R. D W., of Mass.—Some slacked lime introduced into your well ought to kill all the leeches. It will not take much to do this, but it will make the water hard. We can recommend no other thing. You should use considerable lime, let the well stand for a day or two, then pump it out, and let it fill up with fresh water.

G. G., of N. Y.—Water has been forced up tubes by the waves of the sea. A pump to be operated by the waves is not a patentable idea, but your method of accomplishing the end may be. Your float pump may combine some features for which a patent may be obtained.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, Oct. 6, 1855:—

B. & H., of Mass., $25; J. H. M., of Mo., $55; N. C., of Ct., $30; T. & S. H., of N. Y., $30; G. W. P., of N. Y., $10; H. L., of N. C., $30; H. W. C., of Mass., $25; W P. C., of La., $30; H. N. D. G., of N. Y., $30; H. N. B. of N. Y., $30; J. G. W., of N. Y., $39; W. H. M., of Mass. $30; W. B., & Co., of R. I., $25; M. R., & Sons, of Pa., $25; F. & H., of Mass., $30; J. A. B., of Cala., $40; A. M., of N. Y., $30; I. S. P., of Vt., $30; J. C. D., of N. J., $250; I. T. J., of Ill., $45; B. T. B., of N. Y., $50; R. T. S., of N. J., $15; J. H., Jr., of Wis., $30; A. Q., of N. Y., $30; H. B. B., of Eng., $559,67; A. C. P., of N. Y., $22; G. W. S., of Pa., $30; L. M. B., of N. Y., $65; C. A. S., of Mass., $35; J. McM., of Ky., $40; P. W., of Pa., $30; G. N. S., of Ind., $30; S. B. McA., of Tenn., $30; J. G., of N. Y., $30; E. D. L., Jr., of Mass., $30; J. B., of N. Y., $78; D. P. F., of Mass., $60; B. O'R., of N. Y., $10; S. M., of N. H., $25; W. L., of Md., $50; A. S., of N. J., $30; W. S., of N. Y., $25; J. S., of N. Y., $25; T. W. B., of O., $25; L. J. W., of N. J., $25; S. A. K., of S. C., $40; H. L., of N. Y., $30; C. A., of N. H., $50.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Oct. 6:—

B. & H., of Mass.; H. W. C., of Mass.; C. J., of N. Y.; W. S., of N. Y.; J. P., of N. C.; J. S., of N. Y. T. W., B., of O.; R. T. S., of N. J.; B. T. & L., of England; W. B., & Co., of R. I.; L. J. W., of N. J.; M. R., & Sons, of Pa.

Important Items.

Back Numbers and Volumes—The following numbers and volumes of the Scientific American, are for sale at this office, at the annexed prices:—Volume VI., Vol. VII, Vol. IX, and Vol. X, complete. Price, *bound*, per Volume, $2,75. Numbers in sheets, complete, $2. Of Volumes IX. and X., we have also about 40 numbers each, not consecutive, which will be sent by mail on receipt of $1.

Receipts—When money is paid at the office for subscription, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a bona fide acknowledgment of the receipt of their funds.

Binding—We would suggest to those who desire to have their volumes bound, that they had better send their numbers to this office, and have them executed in a uniform style with their previous volumes. Price of binding 75 cents.

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☞ All advertisements must be paid for before inserting.

Science and Art.

Ammonia; to make it in Iron Works.

The following, from the London *Mining Journal*, is worthy of consideration by our iron manufacturers:—"The vapors which escape from iron blast furnaces may be regarded simply as the atmosphere highly charged with carbon, or as a mixture of carbonic oxyd, cyanogen, and nitrogen. When steam, at a sufficiently high temperature, and air excluded, is mingled with these gases, the oxygen of the steam decomposes the cyanogen, and converts the carbonic oxyd into carbonic acid, while the hydrogen and nitrogen combine to form ammonia; thus carbonate of ammonia will result; but as it may prove difficult to condense this effectually, if the vapor of ammonia were conveyed into a chamber charged with an insoluble lumpy material, so arranged that the ammonia, in ascending, would come in contact with the cold solution of salt trickling down, carbonate of soda and muriate of ammonia might be at once obtained. If, however, an ample supply of sulphate of iron could be procured, it would be more advisable to fix the ammonia by means of sulphuric acid expelled from sulphate of iron, because at the same time, pure oxyd of iron would be produced, which would prove valuable in the subsequent forging of iron. Alkali refuse should be composed of sulphuret of calcium and coke dust. When this is acted upon by steam with sufficient heat, the oxygen of the steam converts the calcium into lime, while the sulphur and hydorgen pass off as sulphuretted hydrogen. When the latter is mingled with the vapors from a dense purely carbonaceous fire, consisting of carbonic oxyd and nitrogen, the latter combines with the sulphuretted hydrogen, and forms sulphuret of ammonia. If these vapors are then partially cooled down, and a large quantity of cold air admitted, the carbonic oxyd becoming carbonic acid, combines with the ammonia, and disengages sulphur; thus carbonate of ammonia and sublimed sulphur might be obtained. If, on the other hand, the heat of the vapors is maintained, and a large quantity of heated air thrown in, the sulphuret of ammonia is converted into sulphite, which rapidly passes into sulphate of ammonia, by means of which more salt may be decomposed; and thus alkali refuse may be brought to yield sulphate of soda, muriate of ammonia, and carbonized lime dust. This latter material will be valuable in agriculture; it should be worked into the land when preparing it for seed, muriate of ammonia being afterwards applied to the growing crop, when the first shower of rain will carry it into the soil, when carbonate of ammonia will be disengaged in direct contact with the root of the plant. By treating gypsum as sulphate of lime, with small coal and high heat in a reverberatory furnace, it would be reduced to sulphuret of calcium, and may, by a similar mode of treatment, yield the same product as alkali refuse.

T. H. Leighton."

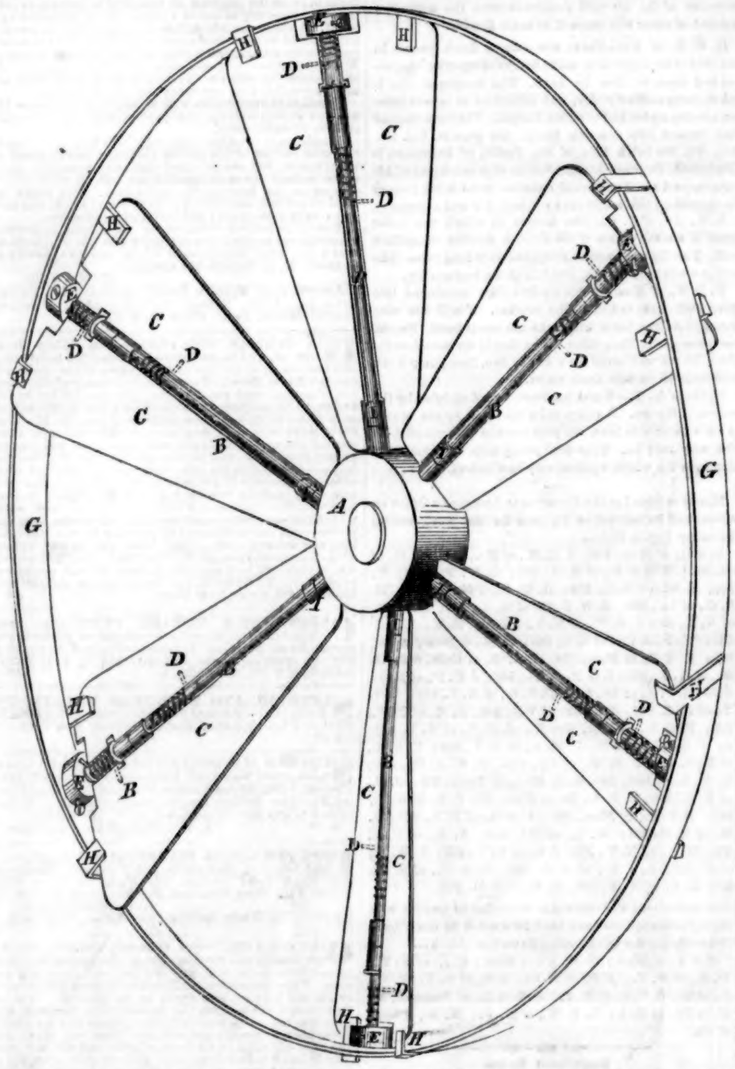
Cast Steel.

In manufacturing the commoner descriptions of steel, particularly cast steel made from English iron, oxyd of manganese has been largely used; its use produces malleability to a common metal, and the effect upon the steel during the operation of melting has been a subject of much speculative discussion amongst scientific men.

I find no alloy of metallic manganese with steel, and certainly the very small quantity of carbon which the oxygen of the manganese takes up, affects the degree of hardness very slightly.

I have examined this interesting matter, and in doing so I have set up no theory of my own, but I have carefully examined the scoria or slag produced, when oxyd of manganese was used, and when it was not; the metal also has been carefully weighed before and after melting. In my experiments I used English iron, which is so coarsely manufactured that it is mixed up with much deleterious matter. In more nicely investigating this subject I used a Swedish iron, which contained a large amount of silicate of iron. I charged two crucibles with this Swedish metal properly converted into steel, each 30 lbs. Into one I put 3 per cent. of oxyd of manganese—into the other nothing. Both crucibles were in one furnace, and melted down in about the same length of time. In that crucible containing the oxyd of manganese I got more slag and a little less metal than in the other. The ingot melted with manganese drew very sound under the hammer; the other was filled with cracks. On an examination of the metal and the slag resulting from each crucible, I found that the oxide of manganese had attacked and dissolved all the silicate of the metal it could find, as the metal melted, and converted it, with other deleterious matter, into a glassy slag, which is very fluid. The steel being thus freed from these noxious matters, is precipitated by its own gravity, and the molecules of metal coming in closer contact by the removal of the foreign matter which before more widely divided them, the metal becomes very malleable under the hammer.—[C. Sanderson.

ELGAR'S PATENT COMPENSATING WIND WHEEL.



The annexed figure is a view of the compensating wind wheel of J. Elgar, of Baltimore, Md., for which a patent was granted on the 10th of July last.

The wheel is made entirely of iron. A is the cast iron hub, in which are inserted the arms, B, of wrought iron. G is the rim, made of flat wrought iron, and in this the outer ends of the arms are inserted by being tennoned in screw nuts, E. C C are two wings on each arm, B, they are made of sheet iron; for a ten foot wheel they are four feet long and two feet wide at the outer end. They are hung by hinges of strap iron to the arms near their outer ends, and rest on washers and pins, I, on their inner ends, and against collets at their outer extremities. D D are two spiral springs made of steel wire, and secured as shown to each arm. One spring is made much stronger than the other, each is coiled loosely about four inches in length, and has a tail about seven inches long pressing against the back of a wing. H H are stops on the rim of the wheel—one for each wing.

The object of this wheel is to afford a means of self-regulation or goverment in the wheel itself, by the combined and reciprocal action of the wind and springs upon the wings. It will be observed that there are two wings hung by hinges on their inner edges to each arm, B, of the wheel, and that they are thus independent of one another. They can revolve within certain limits, and are kept up against the stops, H H, in their proper angle to the wind in plane with each other by the coiled springs pressing on their backs. Those wings which, in the rotation of the wheel, are aft of the arms, are held up to their work by the outer springs, D, which are so strong that they yield only in cases of high winds, to relieve the wheel from too great pressure. In common winds they are stationary, and furnish the means of a constant power to propel the wheel. Those wings forward of the arms in the revolution of the wheel, are held up to their stops in light winds by the weaker inner springs, D, which yield easily when the wind grows stronger. Every degree of movement of these wings back brings them nearer into the plane of the wheel, and thus lessens the power of the wind to produce rotation in the wheel, and when they are forced into the plane of the wheel, their effective power is neutralized. [This result is only produced by a force of wind sufficient to propel the wheel at a proper speed by the stationary wings alone.] As the strength of the wind increases, these wings are forced back beyond the plane of the wheel, and then become a retarding power; and when impelled to an angle equal to that of the stationary wings, with the plane of the wheel, it is brought to a state of rest. When the wind falls or lulls, the wings are restored by the springs to their former positions, and the wheel again rotates—thus being self-acting and regulating. This wind wheel revolves with nearly a uniform velocity, even when the wind is very fickle or flawy. From its safety in storms and steadiness of motion, it is well adapted for grinding grain, &c., and for pumping water at railroad stations, for which purpose it is now applied, and with satisfaction.

More information respecting it may be obtained by letter addressed to the patentee.

Artificial Stone.

Chalk either in lump or in paste steeped in a solution of the silicate of potash (fine sand boiled in a strong caustic lye,) absorbs a considerable quantity of silica. It acquires a smooth appearance, close grain, and yellow color. The stone thus prepared takes a fine polish and hardens by degrees from the surface to the interior. This process may be advantageously applied to making moldings and delicate ornaments of sculpture.

Ancient monuments of calcareous stone may be preserved by washing them with the silicate of potash.—[London Artisan.

Use of Salt in Cooking Vegetables.

If one portion of vegetables be boiled in pure distilled or rain water, and another in water to which a little salt has been added, a decided difference is perceptible in the tenderness of the two. Vegetables boiled in pure water are vastly inferior in flavor. This inferiority may go so far, in the case of onions, that they are almost entirely destitute of either taste or odor, though when cooked in salted water, in addition to the pleasant salt tastle, a peculiar sweetness and a strong aroma. They also contain more soluble matter than when cooked in pure water. Water which contains 1·420th of its weight of salt is far better for cooking vegetables than pure water, because the salt hinders the solution and evaporation of the soluble and flavoring principles of the vegetables.

Chinese "Packfong" (similar to our German silver) according to Dr. Fyfe's analysis, is said to consist of

40·4 parts of copper	equivalent to	6 ozs. 7 drs. full.
25·4 parts of zinc		4 ozs. 1 dr. full.
31·6 parts of nickel		5 ozs. 1 dr. nearly.
2·6 parts of iron		7 drs. nearly.
100·0 parts.		16 ozs. 0 dr.

Literary Notices.

Putnam's Monthly—This sterling original magazine for this month contains some excellent articles. The first is on the "Portraits of Washington," and is a very interesting sketch of the painters who have transferred the likeness of Washington to the canvas. There are few great men who have had so many likenesses taken. An article on "Life among the Mormons" is enough to thrill every heart with disgust for that iniquity. Dix & Edwards, No. 10 Park Place, publishers.